

Title: System, Device, and Method for Providing ... Inventor(s):Michael P. Wagner Appl No. 09/480,390 Filing Date: January 11, 2000 Docket No. 1956/126 Page 1 of 19

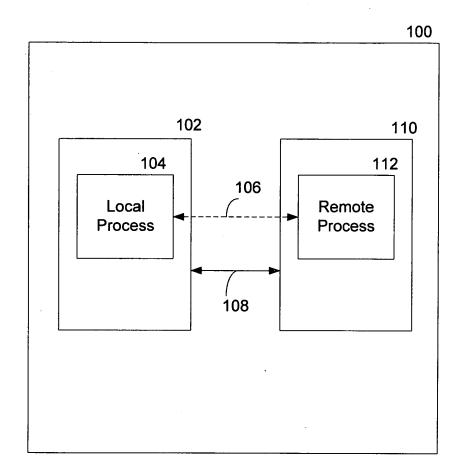


FIG. 1

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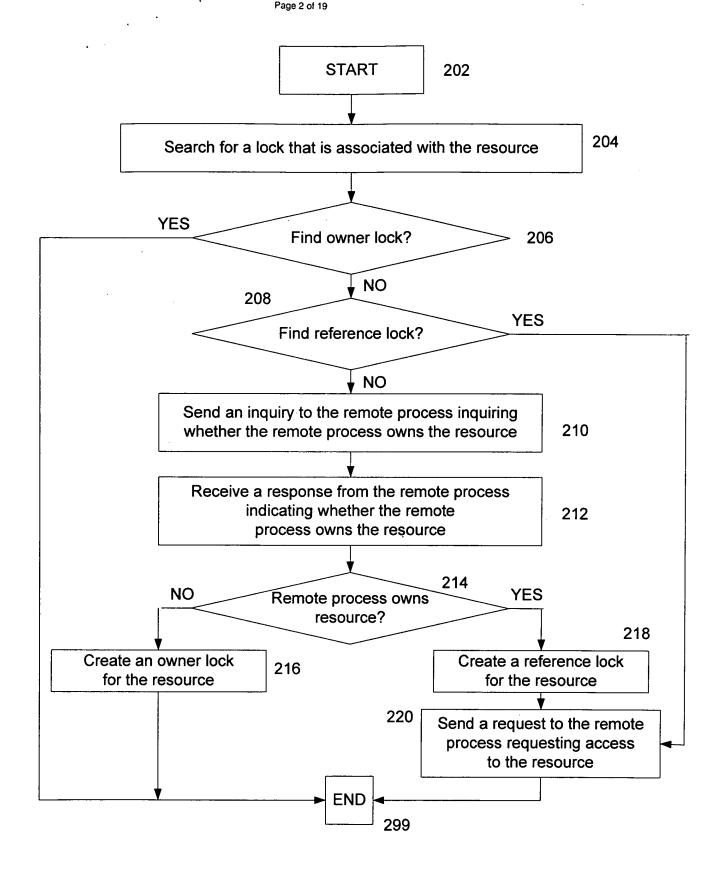


FIG. 2 (200) - ACCESSING A RESOURCE BY A PRIOR ART LOCAL PROCESS

Page 3 of 19 **START** 302 Receive an inquiry from the local process inquiring 304 whether the remote process owns the resource Search for a lock that is associated with the resource 306 308 YES NO Find owner lock? 312 310 Send a response to the local process Send a response to the local process indicating that the remote indicating that the remote process process owns the resource does not own the resource **END** 399

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FIG. 3 (300) - PROCESSING AN INQUIRY BY A PRIOR ART REMOTE PROCESS

Page 4 of 19 **START** 402 Search for a lock that is associated with the resource 404 Fail to find a lock that is associated with the resource 406 Send an inquiry to the remote process inquiring whether 408 the remote process owns the resource Receive a response from the remote process indicating 410 that the remote process does not own the resource 412 Create an owner lock for the resource **END** 499

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FIG. 4 (400) - CREATING AN OWNER LOCK BY A LOCAL PROCESS

Filing Date: January 11, 2000 Docket No. 1956/126 Page 5 of 19 502 START Receive an inquiry from the local process inquiring 504 whether the remote process owns the resource Search for a lock that is associated with the resource 506 Fail to find a lock that is associated with the resource 508 Create a ghost lock for the resource indicating that the 510 local process owns the resource Send a response to the local process indicating that the remote process does not 512 own the resource **END** 599

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FIG. 5 (500) - CREATING A GHOST LOCK BY A REMOTE PROCESS

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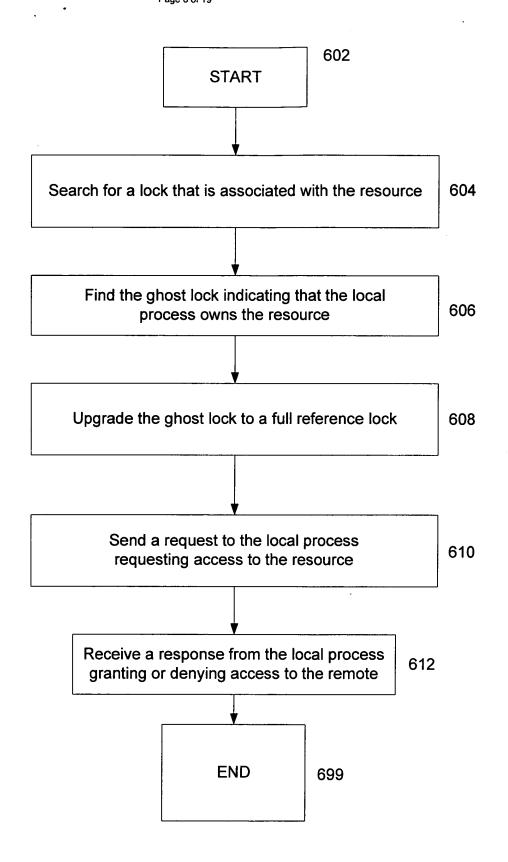


FIG. 6 (600) - UPGRADING A GHOST LOCK TO A REFERENCE LOCK

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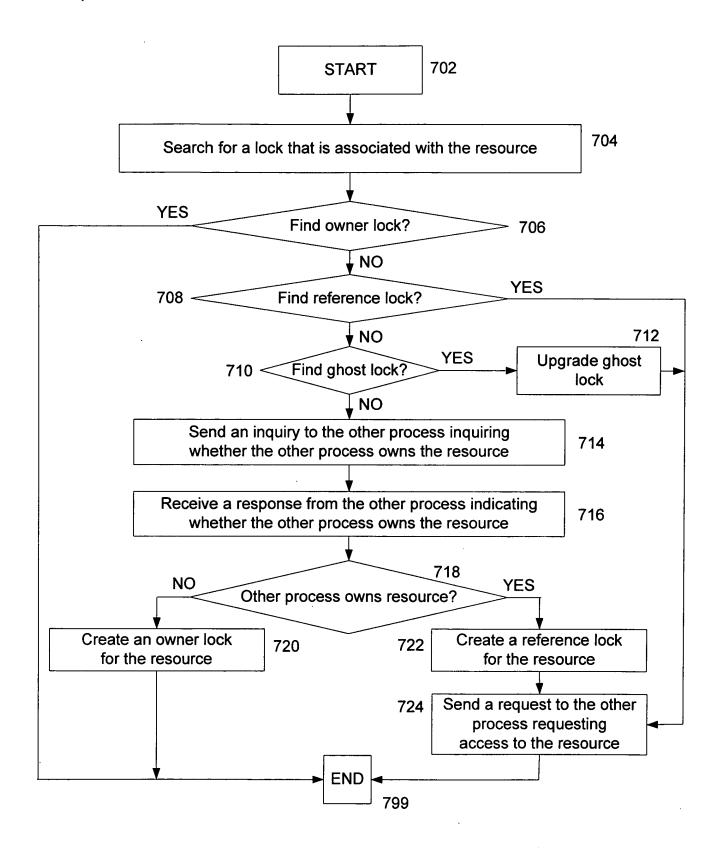


FIG. 7 (700) - ACCESSING A RESOURCE

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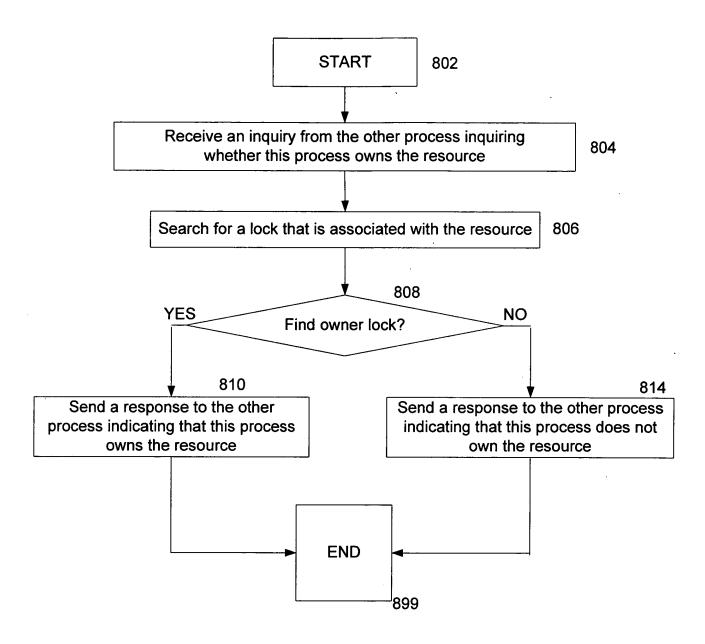


FIG. 8 (800) - PROCESSING AN INQUIRY

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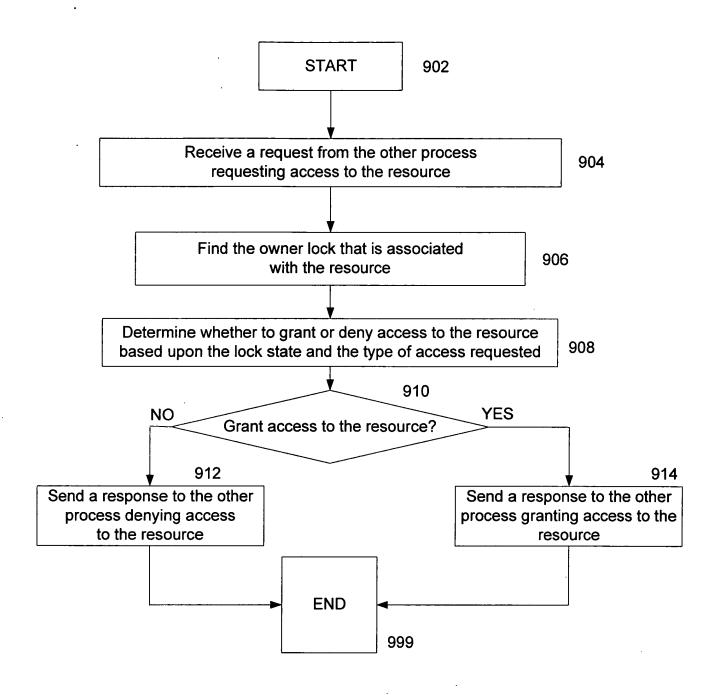


FIG. 9 (900) - PROCESSING A REQUEST

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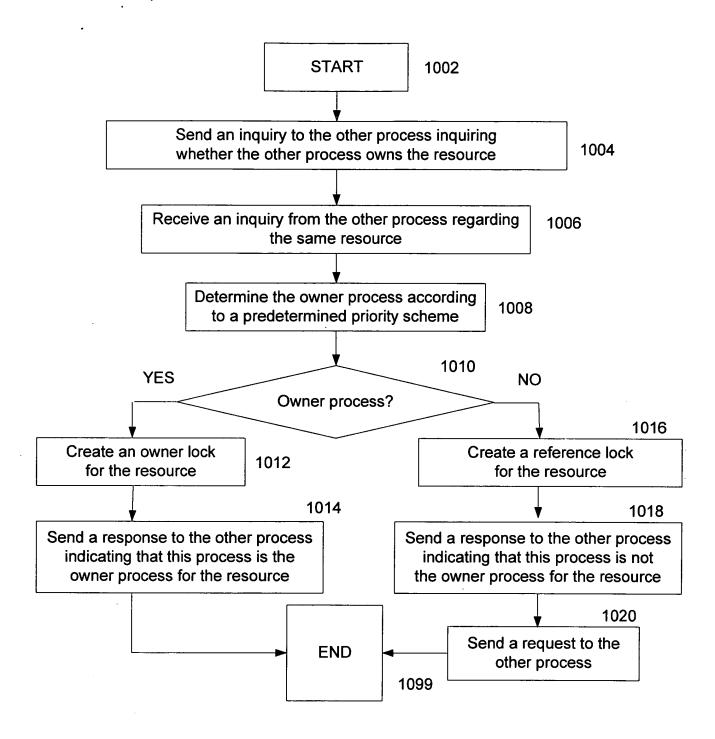


FIG. 10 (1000) - RESOLVING A COLLISION CONDITION

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START 1102 Send an inquiry to all remote processes inquiring whether 1104 any remote process owns the resource Receive from each remote process a response indicating 1106 ... whether the remote process owns the resource 1108 NO Remote process owns YES resource? 1110 1112 Create an owner lock for the Create a reference lock for the resource resource 1114 Send an owner notification message to all remote processes indicating the owner process for the resource 1199 **END** 

FIG. 11 (1100) - EXPLICIT NOTIFICATION MECHANISM TO DETERMINE OWNER

Filing Date: January 11, 2000 Docket No. 1956/126 Page 12 of 19 1202 START 1204 Receive an inquiry from the local process Send a response to the local process and to all other remote processes 1205 indicating whether or not the remote process is the owner of the resource **YES** 1206 Owner? NO Receive from each of the other remote processes a response 1208 indicating whether the remote process owns the resource Determine whether another remote process is the owner of the 1210 resource 1212 NO Another remote YES process is the owner? 1216 1214 Create a ghost lock Create a ghost lock indicating that the other indicating that the local remote process is the process is the owner of owner of the resource the resource **END** 1299

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FIG. 12 (1200) - IMPLICIT MECHANISM TO DETERMINE OWNER

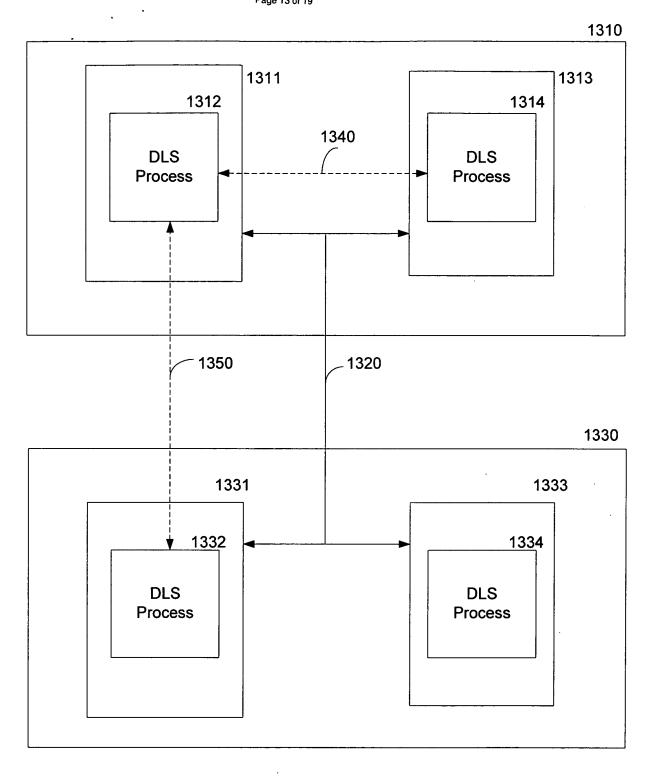


FIG. 13 (1300)

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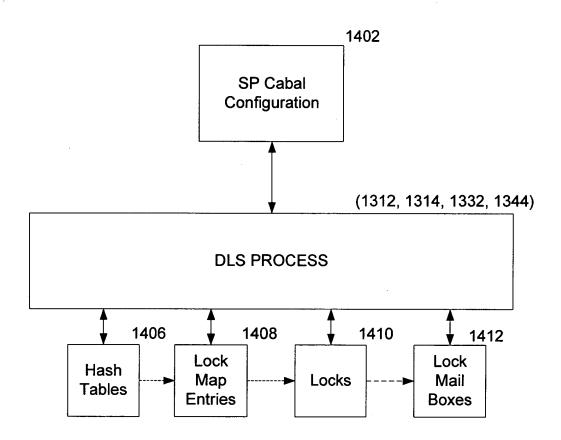


FIG. 14

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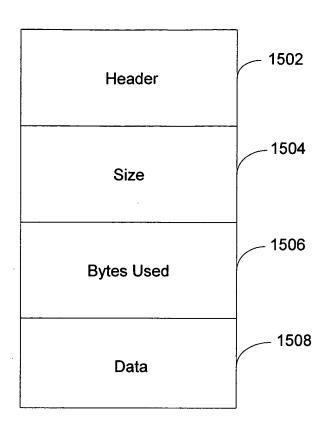


FIG. 15 (1500) - LOCK MAILBOX DATA STRUCTURE

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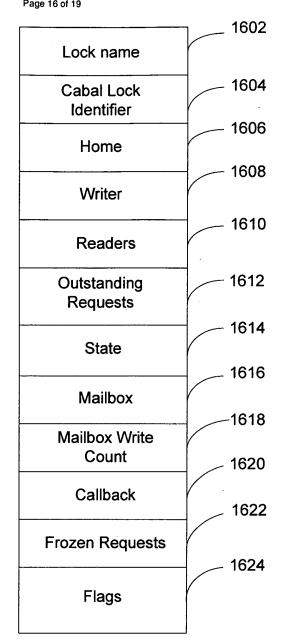


FIG. 16 (1600) - LOCK DATA STRUCTURE

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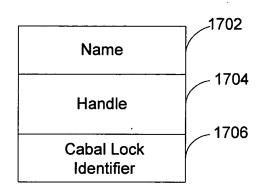


FIG. 17 (1700) - LOCK MAP ENTRY DATA STRUCTURE

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.  Lock Name indicates the name of the lock	1802
Cabal Lock Identifier indicates the cabal-wide identifier for the lock	1804
Home indicates the owner of the lock	1806
Writer indicates any SP that reserved the resource for writing	1808
Readers indicates any SP(s) that reserved the resource for reading	1810
Outstanding Requests lists any outstanding requests for the lock	1812
State indicates the state of the lock	1814
Mailbox points to a corresponding lock mailbox	1816
Mailbox Write Count indicates the number of write accesses granted	1818
Callback indicates a callback routine	1820
Frozen Requests lists any requests received while lock is frozen	1822
Flags	1824

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